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**SANITIZED VERSION OF AREA 5 SUMMARY OF SPECIAL WORK ACTIVITIES AND
IMPROVEMENTS FOR THE YEAR 1956**

(SANITIZED VERSION OF CRD DOCUMENT # KP-1226)

Compiled by
S. G. Thornton
Environmental Management Division
OAK RIDGE K-25 SITE
for the Health Studies Agreement

December 14, 1995

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Oak Ridge, Tennessee 37831-7314
managed by
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the U.S. DEPARTMENT OF ENERGY
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This document has been approved for release
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Technical Information Officer Date
Oak Ridge K-25 Site *(B)*

INTER-COMPANY CORRESPONDENCE
UNION CARBIDE NUCLEAR COMPANY
A Division of Union Carbide and Carbon Corporation

To: K. M. Jones

Plant: Oak Ridge Gaseous Diffusion

Date: July 3, 1957

Copies To: Production Division Central Files
(H. L. Floyd)
File

Subject: Area 5 Summary of Special Work
Activities and Improvements for
the year 1956

KP-1126

The following report is a summary of special work activities and improvements in Area 5 for the year 1956.

ACR Improvements

During the year a number of changes were made in the ACR.

New instrument panels were acquired and the air conditioning unit in the field lab was modified to supply the ACR. To provide better communication, the ACR was equipped with a receiver and microphone on the area PA system.

Audible and visual alarms, which are connected to the unit board constant frequency alarm circuits, were installed under the line recorder slave micromaxes.

A third alarm at the above location is connected to two TIC's located on the line recorder manifolds. These TIC's indicate the temperature of the main trap and chem trap. The TIC connected to the main trap will cut off the diffusion pump heater in case of high temperature, which could be caused by such incidents as water or refrigeration failures. This alarm system permits better utilization of the two-unit operator.

Other installations included a load recorder and a frequency meter for the K-306 section HF power and assay machine indicator lights. Alarms were added for the K-312-2 refrigeration power supply and assay machine low water pressure and for K-312-1 and K-312-3 low lube oil pressure to the VIW pumps.

The automatic sensitivity changer micromaxes on the space recorders were equipped with an automatic control to close the purge control valve when the "tops" concentration reaches a predetermined high.

Purge Operations and Improvements

Since the use of the AGA pneumatic controller for the side purge was not a practical application of this instrument, a pneumatic ammeter controller was installed. This controller uses the motor load on the K-304-5.6 or 8 as an indication of the quantity of UF₆ in this cell; the output of the controller operates the purge valve to shift the PG front to maintain the cell motor load at the set point.

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Since the use of the ammeter controller in the side purge proved to be quite effective, a similar control was provided for the top purge, replacing the X-ray machine as the primary controlling instrument. A new X-ray machine was installed and slaved into the ACR for indicating UF6 concentration in the K-306-7 PW lines.

Due to heavy corrosive action, which had penetrated through the pipe, the purge gas stack in K-312-3 was replaced. An examination of the sample of corrosion products indicated that the origin of the material was primarily corrosion of the stack metal by oxidizing gases being vented to atmosphere. Analysis disclosed about 1.0% uranium and no significant quantity of organic material.

For more flexible operation, piping was installed to permit venting of purge gases from either K-312-1 or K-312-3 through the K-312-2 system.

Product Withdrawal and FPU Modifications

After six months of service, five rupture discs on freeze-out positions in Bank "C" were replaced with silver discs rated 160 psig at 250°F. Position 13 was provided with a silver disc rated 149 psig at 180°F. The vent line backup was replaced with a silver disc rated 55 psig at 180°F.

In October monel discs rated 200 psig at 250°F were installed on all freeze-out positions; discs in the vent lines were not reinstalled. These rupture discs had been in service on Banks "A" and "B" for 13 months and on Bank "C" for eight months.

To prevent bellows rupture during valve back seating, SMD valves with new type locking devices were installed in the FPU system.

Variac controls were installed on the drain header calrod circuit in order to maintain better temperature control and eliminate vapor locks and plugs in the drain header.

Exchange of the FPU reflux and drain control valves for valves with more satisfactory characteristics has resulted in better flow control.

Unit Improvement Programs

Unit seal exhaust systems have been equipped with suppressed range transmitters; so, a bad seal affecting the unit seal exhaust pressure will actuate the unit board alarm.

Due to a high rate of SV pump failures caused by sludge in the oil all SV pumps were converted to Ucon oil with a new oil feed system to the pumps. There have been no failures since this system was installed.

A new alarm system was installed in each unit to give an indication at the unit board of a low level in the lube oil drain drum. This was a planned improvement for all of K-25.

K-312-2 Test Loop

Work was continued in the K-312-2 test loop to obtain information on the characteristics of the VIW pumps. The object of the tests was to determine the feasibility of converting cells in K-312-2 for use as a test loop for barrier. Indications were that the VIW pump should perform satisfactorily, producing a suction volume of approximately 30 cfm with a suction temperature of approximately 200°F when equipped with a ~~steel~~ ~~piston~~ steel piston and operated at 375 rpm. Because of the excessive thermal expansion of the magnesium piston, the desired operating conditions of 15 psia discharge pressure and pressure ratio of three could not be sustained until the steel piston was installed. The solder used on the bellows seal and the neoprene strip to control the bellows expansion were found unsatisfactory at the higher discharge temperatures. Plans for the barrier test loop have been suspended, but on the basis of information obtained, VIW pumps equipped with steel pistons and carbon seals are being used for fluorine disposal systems.

Ultrasonic Alarm System

Since the product withdrawal area in K-306-7 and the product storage area in K-312-1 are classified in AEC Physical Security Standards as class "A" facilities and the materials in these areas are in the sensitive defense information category, the design and location of an ultrasonic intrusion detection system was approved to fulfill AEC storage requirements.


The areas in question are presently enclosed with cyclone fencing and at all times when operating personnel are not present. An ultrasonic intrusion alarm system has been located and successfully tested in the product storage area, and similar protection will be extended to the product withdrawal area. The outlet of the alarm systems will be extended to a monitor system in the K-1020 guard headquarters. The necessary wiring will also be extended to the K-306-7 ACR to provide both a visual and audible alarm. *you locked*

Miscellaneous

For the purpose of calculating fluorine consumption in the cascade, weekly laboratory tests were made of the K-312-1 and K-312-3 purge gases during the year to determine the quantity of waste fluorine in these gases.

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Five coolant coolers were replaced for cleaning since the water control valves were 100% open. Deposits on the tube bundle resulted in poor heat transfer. The copper tubes showed little signs of pitting.



G. T. E. Sheldon

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